NAVY CIVIL ENGINEER

FALL/WINTER 1979

ON THE COVER

LCDR Charles S. Prahl, CEC, USN explains utilities tie-up to naval ship to members of the public works management specialty of the Naval School, Civil Engineer Corps Officers (CECOS), Port Hueneme, Calif. Pictured with LCDR Prahl are Ensign Ronald W. Hertwig, CEC, USN (U.S. Naval Academy '78) and Ensign Allen P. Gifford, CEC, USN (Union College '78).

ENGINEER

VOL XIX, NO. 3
(NAVFAC P-330)
Published By
NAVAL FACILITIES ENGINEERING COMMAND
Alexandria, Va. 22332

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Issuance of this periodical approved in accordance with Department of the Navy Publications and Printing Regulations, NAVEXOS P-35. It does not alter, amend or supersede official regulations, orders or directives. Cost of printing is charged to appropriated funds for maintenance and operations of the Naval Facilities Engineering Command.

Published quarterly, The Navy Civil Engineer is intended for the information of Regular and Reserve personnel of the Civil Engineer Corps, United States Navy, and key civilian employees of the Naval Facilities Engineering Command, subordinate commands and other mission-oriented activities.

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This periodical is for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20401. Price $1.25 per copy. Subscription $5.00 annually for domestic subscribers, $6.25 annually for foreign subscribers. Send remittance to the Superintendent of Documents. Entered as a controlled circulation publication at Los Angeles, Calif.

Published at the Naval School, Civil Engineer Corps Officers (CECOS), Port Hueneme, Calif. 93043.

Manuscripts for editorial consideration and inquiries should be directed to The Editor, The Navy Civil Engineer Magazine, Code C20M, Naval School, Civil Engineer Corps Officers, Port Hueneme, Calif. 93043. Telephone (805) 982-3104, Government Autovon 360-3104.

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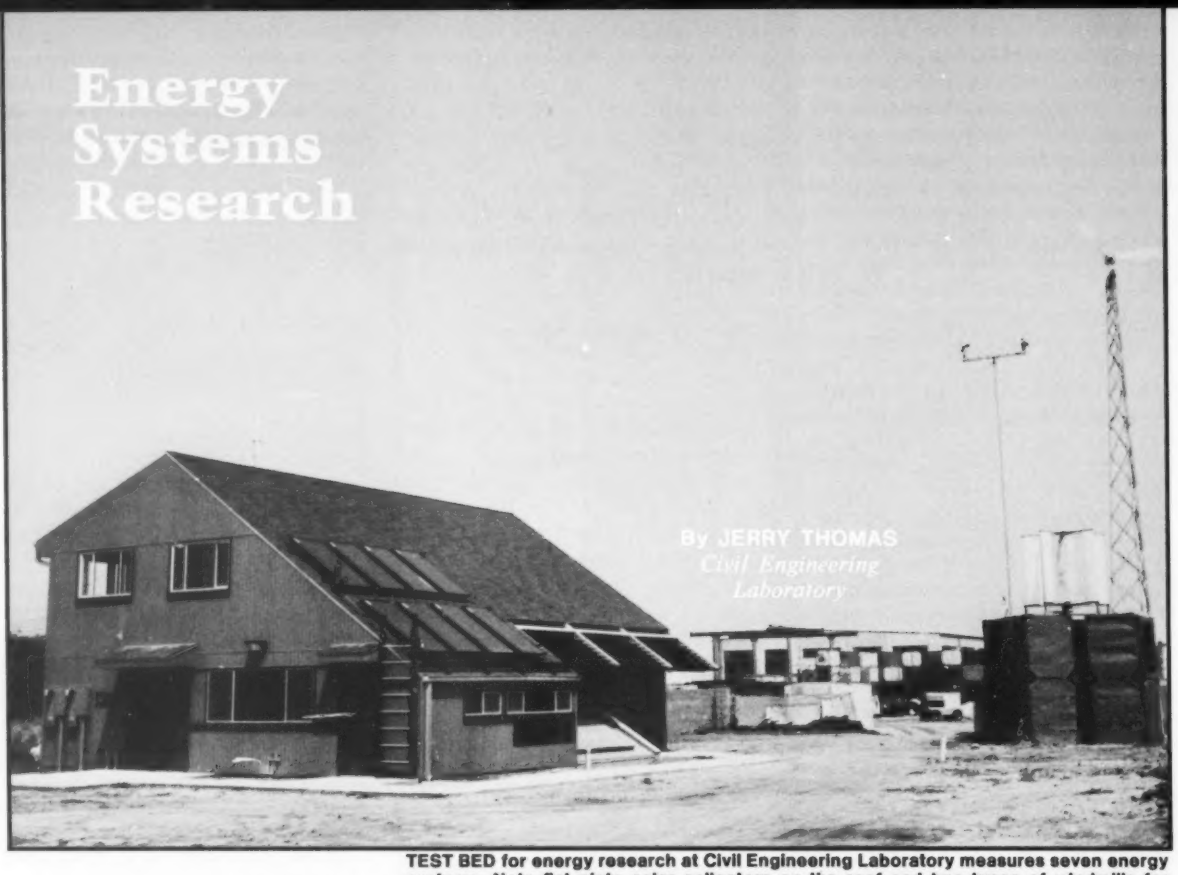
ENERGY SYSTEMS RESEARCH is now underway at the Civil Engineering Laboratory's unique "test bed." The complete details begin on page 4.

SHIP-TO-SHORE transfer of wastewater is demonstrated at San Diego, Calif., precluding pollution of harbor waters. Story is featured on page 23.

BROAD GRIN of Engineering Aide Chief Tim Buckley portrays his pleasure as he reveals his professional secret to author Dave Fraker on page 27.

Energy Systems Research



TEST BED for energy research at Civil Engineering Laboratory measures seven energy systems. Note flat plate solar collectors on the roof and two types of windmills for energy generation at far right.

By JERRY THOMAS
Civil Engineering Laboratory

● Port Hueneme, Calif.

The Navy is striving to be a national leader in the development of new energy conservation methods and alternate power systems.

The Advanced Energy Utilization Test Bed at the Civil Engineering Laboratory (CEL), Naval Construction Battalion Center, Port Hueneme, Calif., is an excellent example of the Navy's continuous commitment in these areas. The AEUTB is believed to be the only site in the country designed and built solely for research and development of energy conservation and alternate energy sources. Its basic purpose is to test specific energy systems and concepts and to evaluate integrated systems.

In fulfilling its operational obligations, the Navy has a limited budget with which to buy energy. Understandably, it directs as many funds as possible to supply its sea and air forces. To achieve the greatest energy return for its financial investment, the Navy wants to reduce consumption of natural gas, electricity and fuel oils at shore facilities. The plan is to make Navy bases independent as possible of commerical energy sources.

The answer can be found in two approaches: development of alternate power systems such as solar, wind, ocean thermal and geothermal energy conversion; and energy conservation.

The CEL test bed is where both approaches can be tested concurrently. New energy concepts are being incorporated into a flexible long-range program of research and development aimed at applying new technology to Navy needs leading to fuel and money savings.

Authorized by the Naval Facilities Engineering Command (NAVFAC) to start construction of the test bed in 1976, CEL will continue to alter the physical characteristics to evaluate a variety of heating, ventilation, air conditioning and energy systems for eventual inclusion into Naval shore facilities. The highly diversified site contains 1,300 feet of working space. By adjusting movable walls and ceilings, it can be transformed into office spaces, medical facilities or typical family housing, complete with heating, cooling and sanitary systems. Incidentally, the single family, two-story, three-bedroom residence for enlisted men is the most common structure in the Navy's real property inventory.

The AEUTB may be common to a variety of building uses but its capabilities are new and unique. For example, utility systems can be switched from conventional energy sources to wind or solar sources by flipping a switch, changing a plug or repositioning a vent. This permits integration of different systems, using solar or wind generated energy to augment or replace conventional sources. Any combination of two, or all three, can be utilized at one time. It is obvious the test bed is not exclusively a solar house.

The test bed's integration capabilities enable engineers to obtain data on system interrelationships; information not presently available anywhere. Only through a testing capability such as the AEUTB can the best combination of energy conservation and alternate energy systems be determined.

The test bed orchestrates seven energy systems during initial research efforts. Two are alternate power sources, solar and wind. The

other five are conservation systems; the shell of the test bed, lighting, heating and cooling, electrical, and finally equipment for detection and measurement of energy losses.

The seven AEUTB systems are briefly discussed in the following reports recently released by the laboratory.

Solar

A successful solar system should decrease the fuel bill while performing an adequate job of heating and cooling. A solar heating system including eight flat plate collectors and a 300-gallon storage tank has been installed for space heating and domestic hot water. The system with a total collector area of 140 square feet is expected to provide 50% of AEUTB requirements and up to 80% when the facility is fully insulated. The collectors are performing according to manufacturer's specifications. Two heat pump systems also have been installed, a conventional air-to-air pump and a solar augmented water-to-air pump.

The test site has provisions for large volume of solar storage in a 2,000 gallon concrete vault. Portable eaves (overhangs) are adaptable for summer cooling and winter heating. The large south window can be used to evaluate passive solar devices.

Presently, engineers and technicians are evaluating the operational aspects of the solar system, installing instrumentation to monitor performance, and designing a second solar heating system to heat water only for domestic use. The system now in operation will then be dedicated to space heating.

In the future, the test bed will assist in the monitoring of a national effort on solar collector rating, standards and certification. It also will investigate such promising solar areas as thermal stratification, concentrating collectors, solar cooling, and other new concepts.

Lighting

Most residential lighting uses incandescent lamps. In the AEUTB, the use of fluorescent lights, which are four times more energy efficient, is preferred. The warm, white prime color lamps have an appearance and coloration similar to incandescent lamps. In addition, the life of the fluorescent lamp is approximately 20 times longer than the incandescent.

Automatic lighting control systems have been installed for technical evaluation. They provide additional fluorescent lighting to supplement natural daylighting. One system is a continuous dimming device that constantly maintains a uniform light level, a combination of ambient and artificial light. The other system features an automatic on-off capability to provide additional lighting when darkness sets in.

The automatic lighting system will be evaluated in conjunction with the adjustable overhang on the south wall. The overhang configuration enables engineers to examine the interactions between heat gain through the windows and natural daylighting.

Low pressure sodium lamps (35 watts) have been installed on the exterior of the structure for security lighting. They have an efficiency about eight times greater than incandescent lights.

In proposed tests designed to increase the use of natural daylighting, the AEUTB staff will install a limited number of windows to evaluate special coatings, daylighting devices, and highly reflective ground surfaces beneath windows.

The use of lighting with alternate energy sources such as wind power also is being technically evaluated.

Construction

Considerable attention was paid to design criteria and construction techniques. A typical Southern California concrete slab foundation was poured. The test bed was designed so the roof on the south side slopes 34°, coinciding with the latitude for maximum solar exposure for heating and cooling tests. Vertical groove, rough sawed plywood siding was placed over uninsulated frame walls because it is one of the local conventional modes.

Complicated but essential instrumentation is being installed to obtain data from the first winter test dealing with consumption and leakage throughout the unoccupied test bed. The occupancy effect on energy consumption, however, is automatically simulated by opening doors and windows, turning off and on a gas stove and water shower. In approximately 18 months, insulation will be added and about 12 storm windows will be put into place. A repeat analysis will be conducted to again determine the amount of energy used, how much enters, and where it escapes.

AEUTB already has proven an accommodating site for the evaluation of a commercial glass fiber wall covering designed to reduce air infiltration. Tests revealed the material accounted for 55% reduction when placed around baseboards, windows, door and ceilings.

A foyer with a removable north wall has been added to the test bed to allow accurate measurement of energy savings and losses in terms of air leakage. Within 15 minutes, the wall can be removed to afford "before" and "after" tests under identical conditions.

Wind

Approximately 180 major naval installations have sufficient winds to merit installation of wind generators to produce electrical power competitive with conventional power plants. It is conceivable that wind turbine generators could supply 3.3% of energy demand for the total shore facilities, for an annual reduction of $10 million in the energy bill.

At the AEUTB site a 5kw wind generator was installed atop a 47-foot tower for six months. It delivered three-phase AC electrical power to an immersion type electrical heater and was used to light fluorescent lamps.

A 6kw grid-integrated small-capacity wind turbine and a 2kw small wind generator are being instralled at the site. The 2kw system is expected to produce 1500 kw hours a year at the AEUTB, or 10-15% of the total energy requirement of an average family house. The 2kw capacity generator will provide wind energy to operate lighting and heat water in the heat storage tank. Future applications will include wind energy to operate a fan for attic ventilation, compressors, heat and water pumps, electric motors, and kitchen appliances.

The 6kw system will yield data on the performance of wind turbine generator and power conditioning hardware for grid integration. The

(continued next page)

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test program on the 6kw set-up will be closely coordinated with the Southern California Edison Company. Methods and hardware developed during wind power research at the test bed will be incorporated into future demonstrations of wind turbines at naval sites to develop data for a Navy design guide.

Heating & Cooling

A solar-augmented heat pump is operational, heating and cooling the AEUTB. During the heating season, solar energy is collected by flat plate collectors located on the roof. The heat is transferred to a large tank of water which serves as a heat storage device. A water-to-air heat pump delivers heat from the storage tank into the test bed. Because the heat source is kept at moderate temperatures, even on the coldest days, the heat pump operates at high efficiency. When the site requires cooling, the heat pump transmits heat from the AEUTB to the storage system, thereby raising the temperature of the water in the storage tank. During the night, the storage water is circulated through the solar collectors and is cooled by radiation to the night sky. In this case, the efficiency of the heat pump also is improved through the use of relatively constant temperature heat sink.

A computer model of solar augmented heat pump systems has been developed by CEL and is being used to assess alternative systems to determine the most cost effective configuration of system components.

Energy Control

Because of rising costs of energy and added emphasis on energy conservation techiques, many devices are appearing on the market, offering potential relief to the pocketbook. In the case of thermostats, conventional devices using bimetallic sensors have evolved over many years of engineering. Past development has centered on tradeoffs between equipment operation and occupant comfort. New devices are now available which use diverse operating principles to reportedly improve energy efficiency of heating and cooling systems. At the test bed, engineeres conducted comparative cycling tests of two different types of thermostat control. Results of the tests have been provided to NAVFAC to determine performance requirements for procurement of new thermostats.

Future plans for control systems call for an optimizing controller which will orchestrate individual energy features of the AEUTB to minimize purchased energy quantities and costs.

Instrumentation

Use and distribution of input energy are monitored by an array of instruments. IR (infrared) scanning detects energy losses from construction defects or subsequent failure of insulation or sealing materials.

An R-Factor meter and data analysis techniques developed by a CEL contractor determine the in-place thermal resistance value of walls and ceilings. Without specialized instrumentation, in-place values are difficult to obtain because of daily temperature changes and thermal lag of the structural component being measured.

Energy losses from air leakage under various climatic conditions are being measured by tracer gas dilution and pressurization/evacuation methods. The effect of retrofits on building tightness (also applicable to civilian housing) will be evaluated with these methods.

Other instruments such as air velocity meters, clamp-on ammeters, and furnace filter gages are used to determine air distribution and duct system balance.

The instrumentation and subsequent data will prove valuable in two ways: as research tools throughtout the AEUTB, and techniques under development will be documented, permitting similar measurements to be taken by NAVFAC field activities, and others, in their energy conservation efforts.

The Energy Program Office at the laboratory provides the mechanism for building an energy technology base, tailored to Navy needs, by assimilating advances made in the national energy program; conducting timely investigations at the laboratory itself; and then transferring that technology to NAVFAC and field activities.

The entire Navy energy program is under the overall guidance of the Naval Energy and Natural Research and Development Office. □

New Field Courses From CECOS

In keeping with NAVFAC's goal of reducing the cost of changes and claims on construction contracts, a Contract Modification Course was introduced by CECOS October 9-13, 1978 in Hawaii and will be offered at various Engineering Field Divisions during the balance of the fiscal year.

Target students are AROICC's civil engineers and contract specialists engaged in construction contract administration and management who have the equivalent of the Basic Contract Administration Specialty Course and a minimum of four months of actual contract field practice.

Specific topic areas of the course relate to: recognition of valid changes; resources for processing, interpreting and managing change; determination and allocation of cost; effect of change on the project schedule; proper documentation for control of change and settlement of proposals and claims; negotiation of price and time agreements; and the development of a professional attitude necessary to best represent the government's position with respect to contract modification matters.

2-6 Apr 1979 at Dam Neck, Virginia. Students from Atlantic Division and Southern Division, Naval Facilities Engineering Command.

11-15 Jun 1979 at Washington, D.C. Students from Northern Division and Chesapeake Division, Naval Facilities Engineering Command, and OICC Bethesda.

Persons interested in attending this course are invited to direct their inquiries to Commanding Officer, Naval School, Civil Engineer Corps Officers, Port Hueneme, CA 93043; Autovon: 360-5655, Commercial (805) 982-5655. □

Government employees can be sued!

By WILLIAM H. SPECK
Counsel
NAVFAC HQ

"As a litigant, I should dread a law suit beyond almost anything else short of sickness and death."
— Judge Learned Hand

Secretary of the Navy Middendorf once remarked that he had to pay attention to his lawyers, after his banker told him a check on his credit showed *400 suits pending* against him!

And the names Brown, Schlesinger, Claytor, and Warner appear as defendants, joining commanders of NAVFAC and EFDs, members of the contract division, and lieutenants as ROICCs and PWOs. Ominously they are sued "individually" and in their official capacity.

These individual government officers are sued because the United States (with some recent statutory exceptions) has not waived its sovereign immunity to suit with respect to injunctive relief and in only certain respects to monetary relief. But individual officers may be sued to halt their allegedly illegal acts, where complete relief can be achieved against them. And the number of illegal acts that they can be alleged to be about to perform or be performing are legion: they may be awarding, causing performance, and making payments upon contracts that allegedly should go to another; building structures, operating facilities, or discharging wastes contrary to the National Environmental Policy Act, the Endangered Species Act, the orders on historic sites, or the Clean Air and Water Acts or the Solid Waste Disposal Acts; or taking personnel steps contrary to civil service or equal employment opportunity rules.

The individual defendant learns he has been sued when he gets a registered or certified letter containing a summons and complaint, or earlier when he gets a telephone call from the U.S. Attorney after that officer has been served.

The complaint proves to be merely a lengthy identification of parties, plaintiff and defendant, a technical statement of jurisdiction, a recitation of acts done, general allegations of wrong-doing, and a prayer for relief.

The complaint may be abruptly followed by delivery or notice of an order to stop everything—a temporary restraining order (TRO)—because the plaintiff has persuaded the judge (perhaps without any notice or hearing to defendants) that he will suffer irreparable injury unless no action is taken until a court hearing can be held.

The summons calls upon the individual defendant to answer within 60 days, and the answer is a formal response, like the complaint. Before or after answer, other actions occur: motions to dismiss, for summary judgment, or other relief are made, each a formal plea supported by a brief reciting facts and making legal arguments and sometimes accompanied by affidavits. Discovery calls upon the defendants to produce documents and files and to appear themselves for questioning with their records or to respond to detailed written questions. Ultimately the case may be heard, either at a preliminary hearing or a full trial. And at last the judge will decide, by brief judgment and order or by lengthy opinion, which may be appealed.

The individual government defendant needs help. Although most of the documents may be somewhat intelligible, with much study and a look at the references, keeping track of them and what is going on takes time. A defense must be prepared from the laws and precedents, files and documents, and witnesses, which takes more time. And the requests for discovery and motions of the plaintiff must be answered, in writing or orally.

The representation of the individual defendant in court is by the U.S. attorney; but this lawyer is likely to be responsible for over a hundred other matters and will know very little about the specific law and nothing of the facts in the individual matter. For procurement, property, navy or even federal law, the Office of General Counsel or Judge Advocate General lawyer must search out the applicable statutes, regulations, and precedents and find what evidence in documents or witnesses may be available in the navy or elsewhere to make a defense.

The OGC or JAG lawyer must prepare these materials in briefs, certified documents, or witness statements for use by the U.S. attorney, either exactly as prepared or as drafts.

Individual defendants personally (apart from some inconvenience) have little to fear from suits, provided they follow court orders and their counsel's advice. If the court restrains them, they halt the Government action concerned, unless in an extremely unusual case the head of the department chooses to proceed. Rarely is relief sought against them personally, apart from their acts for the Government; and though money damages have been claimed in one or two instances, none has ever been recovered. Government officers acting within the scope of their official duties are entitled to at least a qualified immunity from liability, that is no liability unless they acted contrary to the constitution or statutes and without reasonable basis.

But more and more suits may be filed, as statutes like the Clean Air and Water Act amendments expressly make government officers liable like any other person and as statutes authorize attorney fees paid for plaintiffs.

Talk about best bosses

By T. C. MURPHY
Professor Emeritus,
Naval School, Civil Engineer
Corps Officers (CECOS)

Author's Note *These two pieces (the best-worst bosses) are based upon the notion that men who follow know the difference between good and poor leadership, and between good and poor leaders and that such knowledge is not reserved to others. I would like to thank those Seabees who wrote about and discussed this and other subjects with me at CECOS. As Seabees usually are, they were forthright, sensible, in good humor and voluble. It was instructive for both of us.*

It behooves a leader to look back over his shoulder to see if he is being followed. If nobody's there—it should tell him something about himself. It would also tell him—if he's interested—something about the specific gravity of his authority and the nature of his power.

Too often, when there's nobody there, it only 'confirms' his beliefs about the incompetence, stupidity, or perversity of men in general and his subordinates in particular; the old jackass theory of Frederick Taylor, updated, with frequent orations on the 'permissive society' thrown in for good measure.

When it comes to the subject of leadership effectiveness it might be politic—and comforting on occasion—to keep repeating the old maxim: No man is indispensable, or to say the same thing another way: all men are dispensable. But as any group of military men can tell you, some leaders are a helluva lot more dispensable than others—and some are very damned dispensable indeed.

On the other hand 'followers' can go on at great length about the virtues of their best leaders.

For instance: "He has taken time from his duties to help me out personally whenever I needed it. He not only did this for me but for many others as well. He didn't get excited when I made mistakes. Instead, he patiently explained what I had done and showed me how to correct myself. LCDR----was not only liked by me but by all the men in the battalion. He was friendly with them and although during our last deployment the battalion numbered nearly 800 men he knew most of them by first name and nearly all by their position, solely because he was concerned and cared. The chiefs in the battalion especially appreciated him most because he gave them the feeling of importance and integrity. By this I mean he didn't treat us as though we didn't know anything or weren't responsible enough to 'hold our own' in our separate positions. He respected our judgment and intelligence and treated us as managers and supervisors as we were supposed to be. He gave us our self respect back. I have been under other bosses who wouldn't trust the judgment of a chief or other lower rated personnel, but he did. If you were right and did your job he backed you all the way, and if you were wrong he set you straight in a manner of which not to degrade you."

The foregoing is taken from one of the thirty papers written by an E6-7 class attending CECOS in 1975. The class was asked to describe the best boss they had ever worked for, just as two classes had been asked, earlier, to describe their worst boss. *(Navy Civil Engineer, Summer 1978.)* These best boss papers make for better reading.

The predominance of officer nominations for best boss is somewhat surprising. Even though a majority of E-7s (and some E-6s) probably now report directly to company-grade officers, the Seabees were asked to select the best boss they had *ever* worked for—and during most of their 13-15 years service they had worked for petty officers.

There are several possible explanations for this statistical superiority of officers vis-a-vis petty officers. One is the opportunity (and the temptation) afforded the officer to give his 'dirty' work to petty officers to carry out, thus preserving a happier image for himself. This is not an uncommon practice.

This chore of carrying 'bad news' is sometimes given to junior officers by intermediate grade officers, which to some extent may explain the statistical predominance of junior officers in the 'worst boss' nominations.

Another reason for officer dominance is that, for the crew chief, construction progress is too often a daily struggle against awkwardly conceived and unnecessarily confining systems without sufficient support within the command. Consequently, the stresses that develop from deadlines, equipment limitations, material shortages, weather, etc., are absorbed more by crew chiefs than by any others. This practically eliminates him from 'best boss' consideration. In many respects the crew chiefs are getting a bum rap solely on that account.

'Best boss' descriptions were seldom brief. As in the worst boss survey, the statements have been reduced for purposes of this summary to clusters of like or related sentiments within two dimensions: human and technical. Each respondent had many things to say about his best boss.

Although 'best and worst' bosses were naturally very different in many ways, the controlling feature—basic and generative of all other features—has to do with respect (or lack of) for subordinates demonstrated in tangible ways by the boss and the respect they felt for him: mutuality of respect and the concomitant mutual trust that flows from it.

Mutual respect was totally lacking in worst boss relationships with subordinates (and probably many of his other relationships as well). There is no escaping the fact that this is the most crucial of factors in the human dimension of leadership. And it is a matter of the *man*—not his rank, office, position or authority.

Colonel David Hackworth, USA (Ret.), says: "He (the enlisted man) will produce for good commanders; he thirsts for challenge and responds well to the demands placed upon him by *leaders he respects.*" Colonel Hackworth earned two DSCs, nine silver stars, nine bronze stars, eight purple hearts, and three Legions of Merit. Since most of them were earned in combat where leadership pays the highest dividends, one is inclined to pay attention to what he says.

Not only is there a pervasive respect and trust manifest in their best boss descriptions but admiration and real affection as well.

• "The men would have gone to hell for that man if he had asked them." *(Captain)*

"By the time I finished working for him I had nothing but admiration and respect for him." *(Unspecified)*

"If ever a chance to work for this man again regardless of duty or duty station I would go." *(Unspecified)*

There were many indications (not surprising) that working for such men as those described as best boss was more preferable than choice of assignments. It was also made clear that working for such bosses led to career commitment. In the papers describing worst boss, no such commitment was indicated. Naturally.

A question arises at this point: To what extent does poor leadership experienced in the recruit's first tour aggravate the problems of maintaining force levels, training costs, and military readiness? Are desirable attrition/reenlistment rates being met? If not, to what

Who were best bosses ...

Officer		*Petty Officer*	
Captain	2	*MCPO*	1
Commander	2	*CPO*	2
Major (Marine Corps)	1		3
Lt. Commander	4		
Lieutenant	4	*Civilian*	2
LTJG	2		
LDO	1		
Warrant Officer	1		
	17		
Rank/Rate not specified	6		

What their qualities were ...

	Human Dimension	*Times Mentioned*
1.	*Easy to talk to, friendly/ always available, good listener, helpful/ always a 'good morning'/ gave credit, 'thank you'*	27
2.	*Showed concern, respect for subordinates/ trusted subordinates/ good delegation*	20
3.	*No big me-little you/ never belittled a man, reprimand privately/ never got upset, excited, abusive*	9
4.	*Able to motivate men to do best/ enjoy working for him*	7
5.	*Honest, sincere, fair*	6
	Technical Dimension	
1.	*A hard worker, set high standards/ kept self informed of problems, progress*	13
2.	*Discussed, clarified goals/ made clear assignments/ kept men informed/ willing to discuss-act on suggestions*	12
3.	*Knowledge of work/ intelligent decisions/ consistent*	8

(continued next page)

Talk about best bosses . . .

(continued from preceding page)

extent is bad leadership experience a major contributing cause? In short: What does poor leadership cost?

Bad manners, while not often cited in the literature of the military profession, is certainly widely known to troops as a disgusting habit among a significant minority of officers. In the 'worst boss' survey it ranked high as a negative leadership quality. Conversely, good or attractive manners is mentioned more often than any other characteristic of best boss nominees.

"Another good feature this person would do was to always greet the men with a friendly smile, a pleasant good morning, men." What better way to start a day.

Captain S. W. Roskill, R.N., speaks of manners in *The Art of Leadership:*

". . . the bad-mannered person is in fact merely showing his selfishness. There can be no excuse for an exhibition of ill temper or bad manners by an officer: for such failings merely spotlight his lack of self-control. Moreover, bad manners always breeds resentment, especially when directed toward juniors who cannot answer back; and conversely, courtesy is a constant and positive source of good in human relations."

In the technical dimension almost half the respondents mentioned that their best boss was demanding with regard to their performance. No one indicated directly or by implication that he was easy to please or that his expectations were easily met. This will offend those who have always contended that troops like bosses who don't ask much of them and dislike those who do. This is a corollary to the 'leadership is not a popularity contest' proposition. It dies a slow death.

• "He was an extremely exacting individual. When he gave you a task to accomplish he was very specific in regards to the outcome he expected — and demanded . . . If a given job turned out good you knew that the men — as well as yourself — would get a 'thank you' along with a 'well done!' And if you happened to botch a particular project you also knew you were going to stand in front of him and face the music." *(Commander)*

Others wrote similar descriptions.

Although the word motivation was not often used by these respondents, all the clusters in both dimensions contain powerful positive motivational inducements by implication. In contrast, the performance of worst bosses is clearly demotivational — making evident their dependency upon the use of power to coerce or compel men to perform, while abusing or neglecting the human dimension as a power source entirely.

The 'best boss' motivates subordinates to live up to his expectations; he gets *initiative discipline* in return — the only really effective and durable discipline there is.

The 'worst boss' alienates subordinates and gets in return only *obedience discipline,* relatively unreliable, non-durable. He also sustains a high troop-energy loss: Much of their energy goes into gaming strategies aimed at frustrating his expectations, often successfully.

This great difference in the matter of the use of power draws vivid profiles of the two types and shows dramatically what different men they are. Most importantly, the descriptions of bosses, both best and worst, establishes again that the key to morale, discipline, and achievement is leader deportment in the human dimension of leadership.

None of this is novel, ingenious, or new. The same conclusions have been reached, repeatedly, by researches conducted under DoD and Navy auspices over the last 30 years. It is becoming better understood and more widely practiced each year, in industry as well as in the armed forces. This is fortunate.

It is curious but true, as Scott Myers discovered in his Texas Instruments study: The poor leader is characteristically oblivious of the impression he makes upon subordinates and of the comparative productivity measures of his unit's performance. Many poor leaders sincerely believe that they perform well as leaders and that the result of their leadership is high productivity. He is wrong on both counts, but he has a highly developed facility for overlooking abundant evidence to the contrary. He invented tunnel-vision.

A health cautionary

The Seabees in these two surveys have again shown it to be unalterably true: poor leadership is dangerous to the health of the battalion.

But when they write of their best bosses, one gets an unmistakable sense of the pride they feel — in themselves, in their work, in their unit and in their boss. It is clear that they not only worked harder but enjoyed it more.

Pride is a priceless military asset. It has served more often than any other single factor to tip the scales of military success. It is not rare, but neither is it common, easily or automatically come by. It has enormous value. It is the product of effective leadership.

Some believe charisma to be the best of all leadership attributes; but ever since Hitler and Mussolini gave charisma a bad name, it has been generally concluded that, while it can be highly effective in the short run, the direction it takes can raise grave moral questions, post-bellum. Further, it is in the long run that wars are won.

Maybe that's why charisma so often eventually fails. Arrogance and excitement are poor substitutes for pride.

I wonder if Hitler ever thought about that. In the bunker. □

Hope for survival

By JOSEPH HAUTZENRODER
Forestry Technician
CHESDIV

● Washington, D.C.

Most plant and animal species are destined to become extinct. Extinction is a natural process. Then why is there so much concern for threatened and endangered species?

Many people don't realize that the number of plant and animal species inhabiting the earth today is only a fraction of those that have come and gone. This is shown by fossil record. Scientists think that during the Mesozoic era (a period covering some 150 million years) the natural extinction rate may have been one species every thousand years. The rate of extinction from 1600 to 1950 has been estimated at one species every ten years. Currently the extinction rate is approximately one species or subspecies of animal per year! Over half of the 47 major wildlife species that became extinct since 1700 have done so within the last 50 years.

Extinction as a natural process should occur over an extended period of time. Today however, the process is acting on a reduced time scale. There is no counterbalance in species gain (evolution) to compensate for the accelerated rate of extinction.

In 1966 the Federal effort to protect endangered species commenced with the passage of the Endangered Species Preservation Act. This Act directed the Secretary of the Interior to "carry out a program in the U.S. of conserving, protecting, restoring, and propagating selected species of native fish and wildlife." A variety of causes, including habitat destruction, overexploitation, introduction of alien species, disease, and predation contributed to the decline of endangered species. The only measure Congress took to slow the process at that time, however, was to step up land acquisition programs. The legislation did not restrict the taking of an endangered species.

Still under pressure to provide more adequate protection to endangered species, Congress passed the Endangered Species Conservation Act of 1969. This Act expanded land acquisition authority, but the major innovation was its authorization to the Secretary of the Interior to publish a list of wildlife "threatened with worldwide extinction."

The endangered species program mandated by these Acts was still inadequate. It required Federal activities to avoid further threats to endangered species and their habitats, but this was limited to just a few designated agencies. Even more serious was the fact that there were still no restrictions on the hunting and trapping of endangered species.

Increased public concern showed that endangered flora and fauna, because of their esthetic, ecological, historical, and scientific value were indeed a significant natural resource. To amend inadequacies of the two previous Acts, Congress passed the Endangered Species Act of 1973. This Act provided a means to protect the ecosystems that endangered species inhabit. All Federal departments and agencies are now required to conserve endangered species and ensure that any activity funded or carried out by them does not jeopardize the existence of a listed species or destroy or modify its habitat.

To comply with the endangered species act, the natural resource management personnel at the Chesapeake Engineering Field Division (CHESDIV) have collected data to determine what threatened or endangered species might exist on installations under its responsibility. In the event that a threatened or endangered species is located and its existence could possibly be affected by the installations activities, the CHESDIV staff will initiate consultation with the U.S. Fish and Wildlife Service or the National Marine Fisheries Service to determine the species' critical habitat.

Recently the CHESDIV staff conducted a forest inventory at the Naval Surface Weapons Center Laboratory, Dahlgren, Va. They sighted bald eagles on several occasions during the inventory. The endangered southern bald eagles, *Haliacetus leuocephalus leuocephalus,* were known to nest in the area in the past.

They found an inactive nest in a hardwood forest bordering a creek off the Potomac River, however no active nest was discovered. As the inventory progressed, sightings became more regular and perching trees were located, however still no active nest. Confident that there was a nesting pair of eagles in the area the inventory team determined to find them.

The task turned out to be quite simple as they spotted a large nest in the top of a 95-foot loblolly pine tree. After viewing with binoculars, they were convinced that there was indeed an active pair of eagles using the

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Hope for survival

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newly discovered nest. Then their task was to determine the eagles' critical habitat. This is a major problem facing natural resource management personnel. For the most part "islands of habitat within man-used environments" have to be managed to provide the biological, physical and behavioral requirements of an endangered species.

After reviewing pertinent literature and contacting a local eagle expert the natural resource staff at CHESDIV formed a management strategy that would hopefully satisfy the eagles' requirements. The proposed management plan was sent to Federal, State, and private cooperators for their opinions and recommendations.

All responses will be compiled with the suggested management plan and sent to the Regional Director of the Fish and Wildlife Service for a biological opinion as to whether the suggested management strategy would satisfy the eagles' requirements. The critical habitat determination process will have been completed when the Regional Director of the Fish and Wildlife Service has notified CHESDIV of their biological opinion and recommendations.

It is then the responsibility of the Naval Surface Weapons Center Laboratory to make a decision on its course of action in view of the Endangered Species Act. Early indications are that the resident eagles will have a safe place to live and raise their young for years to come. □

the seals return to Midway Island

MOTHER'S UPTIGHT at the photographer for disturbing her after mealtime nap but more particularly that of her pup's safety.

● Pearl Harbor, Hawaii

Due in large measure to a protection program established by the U.S. Navy, the long-absent monk seals are returning to the Pacific Ocean's Midway Islands.

Jerry Swedberg, natural resources specialist for the Pacific Division of the Naval Facilities Engineering Command, reported recently that he had sighted some of the rare animals on Midway, and that he expects more births to increase the size of the herd. Two pups were born on Midway last year, for the first time since the early days of World War II.

Swedberg became interested actively in the welfare of the seals in 1976 when they were declared an endangered species and placed under the protection of federal law. The Navy established the protection program in 1977. It includes appointment of the game wardens as part of the Midway security force.

The monk seal is known to scientists as *"Monachus Schauinslandi,"* and is related closely to similar seals in the Mediterranean and Caribbean seas.

Not that the seals are confined to Midway. They have been seen on all the other leeward Hawaiian islands for over 150 years.

Seafarers reported seeing individuals, or small groups of the animals, on various islands and sand spits. The sightings continued through the 1930s and into the early 1940s, but those were the last until recent years. The Japanese attack on Midway in mid-1942, and the U. S. defensive build-up "undoubtedly discouraged the seals from using the Midway islands," Swedberg said dryly.

In recent sightings the seals have been seen in the waters around Midway and have been spotted occasionally basking in the tropical sun on the broad beaches, especially those on Eastern Island.

Two seal pups were born last year at the Naval Station Midway, and people there hope more will be born this year. Like expectant fathers who have counted the months, Navy game wardens are waiting anxiously for the months of spring, which is the pupping season.

Hawaiians call seals *"ilio holo i kauaua,"* which means "dog running through the roughness." They're docile animals, not inclined to belligerency but not inclined, either, to living near humans.

And, after their births, life can be rough for the youngsters and their parents if they take to the water. Sharks, Swedberg said, like the young pups as an entree. That's a major reason humans are kept off the beaches where the seals live, bask or birth their pups. Humans frighten the seals, who herd their pups into the sea. And that's where the sharks are. □

The philosophy of

Management By Objective

By LCDR JOHN P. BRENNAN, CEC, USN
P.E., Wash.

● Monterey, California

It would seem that MBO is dead, having been made a victim of PPBS and/or ZBB.

While it is true that MBO as a budgetary tool within the Defense Department has been largely overshadowed by program oriented PPBS and perhaps put to pasture by President Carter's ZBB approach to Federal Budgeting, *mbo* appears to be alive and well as a management process.

I differentiate between MBO: the formal institutionalized budgetary approach espoused by Roy Ash in the early seventies which had a managerial philosophy tacked on to it; and *mbo:* a process of management proposed by Peter Drucker in the mid-fifties which could have a budgetary function tacked on to it.

The growth of *mbo* in the public sector stems perhaps from several factors. The lack of a profit motive and in many cases the lack of a revenue function serve to remove a prime motivator from the public sector that is present in the private sector, thus generating the need for an alternate managerial approach. The magnitude of the resource allocation problem, even with the help of program budgeting techniques and zero base approaches, has grown to the point where another management tool is needed in order for management to cope.

People who work in the public sector, have great difficulty in relating what they do to the DoD PPBS program structure. Perhaps they experience similar difficulty in relating the program structure to the weapons systems that they support. Thus the ultimate benefit of their efforts is nebulous at best.

The complexity of modern management has also contributed to the growth of *mbo.* The rate of technological change appears to be increasing exponentially. The refinement of information systems designs has made information available at dizzying speeds. Many public sector employees have achieved satisfaction of the motivators of job security, income, and location in the organizational hierarchy. They appear to be motivated toward other factors such as the acceptance rate of their ideas, perhaps even the existence of a climate in which they can think creatively and feel free to express their ideas.

What then is the process labeled *mbo?* "If you don't know where you're going, then any road will get you there.", a quote from an anonymous author, pretty well sums up the importance of objectives to managers. Whether managers plan what is to be done, examine alternative ways to do the job, or actually perform the tasks, the purpose or goal of their effort remains of paramount importance.

Some people might say that they have managed by objectives all of their careers. They established a target for a given time period, laid out a plan of action to meet that target, took action, and received feedback as to how they were doing. If they managed well, they reached the target at the end of the time period. But how did the target relate to overall objectives? Others said that *mbo* was a way of doing business. The forces were lined up, the boss stated the objectives — take the hill . . . build the hospital . . . sink the ship — and all hands were expected to turn to and do the job. But why, and is there a better way?

Others believe that *mbo* is a good management system. It can be used in planning, controlling, evaluating, and compensating. It has been successful in other organizations. Let's install *mbo,* buy it like a microwave oven, take it to the office, and stick it into our organization, like we would plug in the oven.

I suggest that the above approaches to *mbo* have shortcomings, are somewhat mechanistic, are given to accept too much at face value, or at best address only a portion of the *mbo* concept. *Mbo* is not a program to be implemented, nor a fancy acronym to force on people, but a way to work with people in a complex organization. We might define *mbo* as an "ownership" way to relate organizational needs and goals to individual needs and goals or a participative way to commit people to creatively pursue organizational goals; *mbo* can be an effec-

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management by objective

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tive way to illuminate organizational objectives in the planning process and to examine alternate ways of objective achievement in the implementation process. To manage efforts toward objective attainment at the operating level, while maintaining control throughout, is what *mbo* is all about.

Many words are used to define the elements of an *mbo* system. Goals, objectives, programs, tasks, milestones, elements, and divisions of these words exist and are used interchangeably. The specific word used is not important, but its context is. Very nice statements — such as improve readiness, increase efficiency, reduce energy — have been made. These general statements of desirable ends are not constrained by resources, are not time specific, and are hard to quantify. Such statements are defined as command objectives in the NAVFAC Command Management Plan. For these objectives to be of use in running an organization they must be transformed into a more quantifiable form, become time specific as to milestones, and be made subject to resource constraints. The Command Management Plan accomplishes this function by grouping activities into programs, defining program functions, and then establishing long-range program objectives which are measurable, time-specific action statements constrained by resources.

Very nice, but who does the actual job? In other words, how is more detailed responsibility partitioned? Achievement of NAVFAC long-range program objectives is the overall responsibility of the Program Manager. Responsibility for accomplishment of short term, very specific, annual goals rests with specified field activities or in some cases headquarters divisions. Further explicitness as to — who — does how much — by when — exists with the Command Management Plan and in the annual goals statements prepared in a dialogue between Headquarters and the operational level.

Objective establishment in *mbo* is a collaborative process. Top management may establish the broad conceptual objectives of the organization, perhaps some specific objectives as well. Lower levels of management generally participate in transforming the qualitative objective statements into quantitative goals for a specific mid or short-range time period. How much goal setting should top management do and how much objective establishing should mid management do? A compromise, a compromise that fits the organization and its people. Autocratic imposition of goals from the top has had a history of dissatisfaction, if not failure, because the basic *mbo* concept of participation has been voided. It has been said and often demonstrated that the best executed plans are those developed by those who will be expected to execute them.

Perhaps if top management addresses what to do, issues of broad opportunity or challenge, mid management addresses how to do it, how much to do, and who will do it, and operating management does it and asks itself how well it did the job, a proper balance can be obtained. While the preceding statement appears quite black and white, a lot of grey exists. Conflicts will occur — several organizational elements may be performing the same task. Some tasks may not be done by any part of an organization. Some goals from above may not be palatable to those below and some goals or program objectives proposed by lower management may not be tasteful to those above. I suggest that these conflicts are healthy. Duplication minimized, gaps reduced, upward and downward channels of communication utilized — all motivators to commitment. Commitment because it was invented here.

Failure to include a control or evaluative mechanism in an *mbo* approach results in history by objectives, not management by objectives. The evaluative function looks backward over what has been accomplished in order to respond to questions such as: Did the organization produce what it was supposed to? Did an individual produce what he or she was supposed to? Did what we produce cost what we expected? How much did it cost to produce a unit of service such as a track audit? While many of these questions are evaluative of past performance, the responses greatly assist in the budget formulation process. What additional costs would be incurred if we perform two additional track audits next year? Is contracting a better way?

The Goals Progress Report provides output or production information for managerial control purposes. While the IPMS reports attempt to correlate cost with output, precision is lacking, as it is in many DoD cost reports. To paraphrase Winston Churchill, the IPMS system is the worst financial reporting system in the world, except for the rest. The information available in these two documents, however accurate, does provide many levels of management with the information needed for evaluation of progress and subsequent decision making.

the concept is alive

An *mbo* approach appears to fit in well with managerial needs at several levels of NAVFAC management activity. Establishment of broad objectives, general partitioning of responsibility and resource identification occur at the planning level. In the implementation phase more specific objective statements are formulated, annual goals are established, and specific action plans are prepared along with exacting responsibility and resource statements. At the operating level production takes place. Output and financial reports are produced to serve management's control and evaluation needs.

NAVFAC's Command Management Plan and its attendant documents possess the characteristics of a classical *mbo* approach. The Plan appears to be working well in NAVFAC as a policy document, a planning tool for products and finances, and, coupled with product and financial reports, as an evaluative tool.

In 1934, the *USS Ranger* was the first aircraft carrier to be built from the keel up. In that same year the San Francisco City Council decided to rate their managers by their degree of objective attainment. In 1976, the City Civil Service Commission agreed that that was a good idea and that it should be done. Lip service to an *mbo* approach has little merit. It seems that much more than lip service has been devoted to the *mbo* concept in the NAVFAC Command Management Plan and that *mbo* is alive in Alexandria. □

The philosophy of management philosophies

By LCDR R. E. KENNEDY, CEC, USN
E.I.T., Wash.
Resident Officer in Charge of Construction

● Guantanamo Bay

Sounds redundant, right? Think about it for a moment. Is there anything in our business more replete, more extensive, more numerous, more contradictive, more counter-productive (ergo more redundant) than management philosophies?

There's management by objectives, management by exception, management by K.I.T.A.*, management by direction, management by "big chunks," management by "squeaky wheel," management by dollars, management by personality, management by Kepner-Tregoe, management by transactional analysis, and so on ad infinitum. Now, we're told of a possible addition of "Management by Collaboration" by *M. C. Koblos (Navy Civil Engineer, Spring '78).*

As I sat in the miasma and pondered, I thought and thought until I thought, "that sounds suspiciously like management by committee." The logical (I hope!) progression recalled the wag's comment, "A camel is the result of a committee's work in designing a race horse." Then, I went off scale, had to clear the memory, and started with all new (or more correctly, different) data.

As an abstract concept, it would appear that the sole purpose of any management philosophy is to achieve some given goal using some given assets in some more or less random fabric of time and circumstance. Assuming that this is a correct premise it then becomes evident that there may be no single management philosophy which can be applied to all areas of the facilities business (which is, admittedly only a small part of the whole management game). This possibility, however, flies right into the face of standardization (centralized management, if you will), and the widely held concept that *newer* is always better.

Close evaluation of this abstraction causes an evolution from possibility to probability that there is *no single, all-encompassing management philosophy*. There is a single purpose for management philosophies which has been already stated, and no matter how the warp and woof of the random fabric change, the purpose remains goal achievement.

Further examination of the concept in the light of real work situations adds even more credence to the premise. For instance, if we devise a management system to operate with less paperwork, one of our first efforts is to prepare instructions on how to prepare the reports that will show the effectiveness of our system. Or, our objective of shortening the design time-cycle meets head on with our objective of fewer change orders to the contracts.

Or, management action directing a reduction in personnel (ostensibly to save tax dollars) results in an actual increase in tax dollars spent due to contract accomplishment of the vacated jobs. Or, maintenance shop productive manhours end up reduced when the transportation shop's cost per mile is reduced to award-winning values, or a $60,000 fire protection system is installed to protect a $20,000 building with the capability of containing $20,000 worth of material, or the requirement for report preparation prevents accomplishment of the work being reported, etc.

I am convinced that there is no single management philosophy that will effectively and efficiently produce "design results" in all (or even the majority of) the cases to which it is applied, when applied without modification. This conviction leads me (at the risk of contradicting my own premise and being roundly damned for adding to the plethora of management philosophies already in existence) to introduce the philosophy of "Management by What Works." This is not a new philosophy, it is just unnamed, it is what we as managers really do every day, all other philosophies withstanding.

To paraphrase Admiral Zumwalt's comments about leadership — all good managers manage by example. Decisions must be swift and sure, based on the best data available. The time taken to develop that decision must be directly proportional to the relative value of the item being decided. Most importantly, when it becomes evident that a decision is in error, efforts to correct the situation should begin immediately rather than trying to fix blame for the error with the attendant efforts of justification (which unfortunately succeed sometimes to the degree that the obviously erroneous course continues to be followed).

"Long Live Management by What Works." After all, the best gauge of the effectiveness of a management philosophy is successful goal accomplishment. □

**An in-house acronym best translated as a 'kick in the posterior'.*

The one and only "Mighty Mo"... now at rest

The Missouri's 16" guns last roared in the Korean War, for which she received five battle stars.

The *U.S.S. Missouri,* on whose decks the surrender of Japan was formally received, now reposes in the calm waters of Puget Sound. In reserve status the "Mighty Mo" receives over 100,000 visitors annually. One such visitor was JO1 Kirby Harrison whose photographs capture what the battleship really was.

(Right) A visitor's center is featured on the quarterdeck displaying the battleship's historic role in WWII.

(Left) Tranquil after two wars and over a half-million miles of duty, the U.S.S. Missouri will probably not see naval action again.

Another page for the Seabee Album

URGENT — A Gulfport, Mississippi, based Seabee battalion has been named the most outstanding of the eight Naval Mobile Construction Battalions (NMCBs) in the Navy's construction force, according to Rear Admiral D. G. Iselin, Commander of the Naval Facilities Engineering Command, headquartered in Washington, D.C.

NMCB-74, commanded by CMDR. Donald McCorvey, was presented the prestigious Peltier Award by Iselin during ceremonies held at the Gulfport Seabee Center.

WHAT'S IN A CAREER — (Below left) A tender young lieutenant (junior grade), in 1955 at the Civil Engineer Corps Officers School (CECOS), Capt. Benjamin L. Saravia, CEC, USN, now commands the huge Seabee complex where the school is located, the Construction Battalion Center, Port Hueneme, Calif. Right photo finds Captain Saravia hosting John Wayne, renowned actor whose roles include "The Fighting Seabees." Long a Seabee supporter Wayne had just concluded narration of a film concerning the center.

What are our plans about Planning?

By LT E. C. RUSHING, JR., CEC, USN
Director, Facilities Planning Division CECOS

● Port Hueneme, Calif.

We proudly claim *planning* as an important part of our role as the Navy's Civil Engineer Corps. We can point to strong organizations at the headquarters and field level that support planning. The Command Management Plan prescribes goals and objectives for planning.

But in fact, we are *not* the only game in town when it comes to planning our shore establishment. Facility planning is performed at activity level by a wide variety of individuals and organizations completely unrelated to the Civil Engineer Corps or the NAVFAC family.

For example:

- A master chief machinist's mate is the planner for an activity involved in a major mission change;
- A surface line lieutenant commander, working at his first shore duty in many years, is the director of a planning staff for a large training command; and
- A Navy Weapons Station has a planning staff which operates independently of the Public Works Department.

Some major claimants admit that facilities planning is often delegated to line junior officers in their first tour of duty, waiting for a fleet assignment. Let's not question the quality of the work from these planning officers. They may be doing perfectly fine jobs. However, we should be asking ourselves these questions about this trend:

Are we letting planning slip away from the role of the Civil Engineer Corps?

Should we give up this role?

If we believe that planning is our responsibility, what can we do to improve our performance and keep the planning role?

The basic policies which address facilities planning have not changed significantly in the past several years. (OPNAV Instruction 11010.1 defines the responsibilities for facilities planning and programming.) Under this charter, NAVFAC is responsible for developing and managing the Navy's Shore Facilities Planning System (SFPS). This same instruction requires activity commanding officers to comply with the planning system, and to take the initiative in planning. However, there is no requirement that the activity commanding officer assign facility planning to his public works function or to his CEC officers. In fact, as noted by the cases listed above, many do not.

If interest in training is an indicator, planning is appealing to more and more people outside of the CEC. During the past year, the Naval School, Civil Engineer Corps Officers (CECOS), trained over two hundred people in SFPS procedures. Out of this number:

- One was the executive officer of a submarine support facility.
- Three were candidates for the Supply Corps POL Intern Program. This program prepares young Supply Corps officers to maintain and operate the Navy's major fuel facilities, including facility planning.
- Eight were Marine Corps and ten were Coast Guard officers.
- Approximately 18 students represented various line organizations.

What does all of this mean? Simply this: NAVFAC and the engineering field divisions are tasked to develop and manage the shore facilities planning system. However, activity commanding officers do not feel bound to go to their public works department or even to the CEC for planning expertise. They are looking at alternatives, and they are training others in planning.

Planning by organizations outside of the Corps and NAVFAC is not automatically bad. There is much good to be said about planning organizations that have direct access to commanding officers, instead of working as a sub-system of a department. A planning staff working directly for the command office may have the best comprehensive view and may make the best decisions for the overall good of the organization.

Should we be concerned?

We should ask ourselves: Are we qualified to do planning? And, what are the functional problems if we are not included in the planning process?

Looking at the first of these questions, let's analyze the classical role of the planner, which is to give advice to a decision maker. The value of this counsel is based on the planner's technical ability, analytical skills and ability to express facts clearly and simply. A decision maker measures the advice of his planner in light of many other factors and then sets the course for his organization.

The Civil Engineer Corps is well suited to this role. As a staff corps, we take pride in our "service to the fleet" ethic. We are composed of highly qualified and competent engineers and managers, and many of us have fleet experience. We have the hardware to develop sophisticated information systems, and we are learning how to use these tools better. We can usually get to the root of a problem and develop a rational approach for its solution. In these areas

we are well qualified to fill the role of facilities planner.

However, we do not have a corner on these skills. Many others are equally well qualified. Assuming we are all equally qualified, how do our other functions relate to planning? To look at a few:

Facilities Maintenance The Annual Inspection Summary (AIS) is a management tool that is getting more attention lately and is being aligned with the same investment categories used for MILCON projects. The effectiveness of an activity's maintenance program affects decisions to invest in new capital improvements. Are activity planners aware of the significance of the AIS, and do they understand its contents?

Development of Activity Funded and Special Projects Increased emphasis is being placed on using these resources to solve facility problems. Do the activity planners know how to use these alternatives, and are they aware of the status of projects that have been submitted?

Engineering Evaluations These reviews validate the information in an activity's planning files and have an important influence on the future planning actions that may be taken. Who coordinates these visits by the Engineering Field Divisions?

Real Property Inventory This task is assigned to various departments among different types of activities. However, the information fed into the Real Property Inventory (RPI) provides the data base for the existing facilities at an activity. The accuracy of an activity's RPI will be reflected in the success of its planning efforts. The planners at an activity must understand the RPI and have a solid knowledge of what is in it.

Project Responsibility A single organization should follow a project through the planning, budgeting, design and construction stages. This responsibility should not be clouded by passing a project through several hands at each of these stages. Are the activity engineers, planners and facility users able to communicate effectively during this process?

If planning is to be effective, it should be under the department or staff that is responsible for these areas. Generally, this will be Public Works although there are exceptions. If the planning function is isolated from these other operations, both the planning and the facility maintenance effort will be working in vacuums.

To summarize this point, the Civil Engineer Corps Officer is qualified to be the facility planner at an activity; however, he may not be the *only* person that is qualified. The Public Works functions are closely allied to planning and should not be isolated from it. The best planning organization for a particular activity is one that combines all of the qualified individuals and the related functional areas.

Where should we go?

A Public Works Officer at a major activity once said, "We have an excellent system for listing our facility requirements, putting them in a logical order, and validating these needs at different review levels. The problems lie at each end of that operation. First, we don't receive enough information from the operators to anticipate their problems and develop sound facility requirements. At the other end, we are not effective at convincing decision makers to commit resources to our real problem areas."

The first problem addressed by this PWO is probably the most immediate for the CEC planner. This basic problem may also underly the movement of planning into special staffs at some activities. However, better contact with the operational requirements of an activity should not be at the expense of isolating the CEC officer and the Public Works function from planning. The CEC officer and his staff should be part of a planning team that includes operational representatives.

The second problem identified by the PWO is tougher. As a staff organization, we rely on the line organization to champion the right causes. How well they do this depends upon their awareness of how a problem affects their mission. In this case, we should look back at one of the basic qualities of a good planner—the ability to give facts simply and clearly. This job can be much easier if our planning started with the involvement of the operators that we are supporting. If they understand how requirements are developed, they can make rational decisions and defend them effectively.

As planners, we must resist being inhibited by our systems if they are not responsive. Where criteria need to be changed, we should actively recommend changes to support valid operational requirements. If our systems are too slow, we should recommend reasonable changes instead of defending an inefficient process. We can earn a lot of points here because *all* planning has to meet the NAVFAC standards. We know how to work within this organization.

We need to become much more familiar with the Navy's mission. One way to do this would be to come up "through the ranks" in a mission area, with the career objective of sitting on a major claimant's staff as the chief facilities advisor. For instance, a junior officer would serve as SCE/ACE or APWO at a naval air station. Future ROICC or PWO duty would bring him back to an NAS. A top position on the Type Commander staff would require this background to insure that the CEC officer understands the mission of Naval aviation. Senior CEC officers with broad operational exposure should then be assigned to major claimants who control diverse missions.

We also need to develop our credentials as planners. Post graduate training in Planning can be extremely valuable to the Public Works Officer as well as to the facilities planner. A professional level graduate program in Planning covers law, economics, policy development, and programming and budgeting systems, as well as physical planning.

To summarize, it would be a real mistake to let planning slip entirely from our grasp. Planning affects us too much to lose control over it. We can make real contributions to the planning effort by ensuring that it is realistic and that requirements can be implemented. On the other hand, we should welcome the involvement of our customers in planning. It would be an equally great mistake to discourage this interest. If facility planning is to remain a part of the Civil Engineer Corps officer's role, it must be a cooperative effort with the fleet we are to support. □

Conservation starts with boiler efficiency

By PHILIP R. WINTERS
and
HARRY R. TAPLIN
P.E., Calif.
Navy Environmental Support Office

● Port Hueneme, Calif.

The Navy Environmental Support Office (NESO) has been intimately involved in NAVFAC's Boiler Tune-Up (BTU) Program for more than four years. During this time, NESO engineers have tested and adjusted hundreds of boilers and have been able to save the Navy significant resources.

Typically, when a NESO test team arrives on site to perform an optimum performance test — that is, to validate the fact that a unit is performing at *its* maximum achievable efficiency — things are not as they should be. This is true even though stack emissions are well within allowable limits and the boiler is "purring" to the ears of the visitor.

Using inexpensive test equipment, examination often reveals excess air settings that are high enough to create the illusion that the plant is attempting to heat the world's atmosphere. Equipment gages are found to be out of order — or, worse yet, were never installed — and, in some cases, there is a complete lack of test equipment.

Each time these conditions are encountered, the test engineer takes care to explain that a boiler can be wasting thousands of gallons of fuel every day with never a wisp of smoke or other obvious indications of trouble. Then, having given the brief lecture, the engineer tries to set things right.

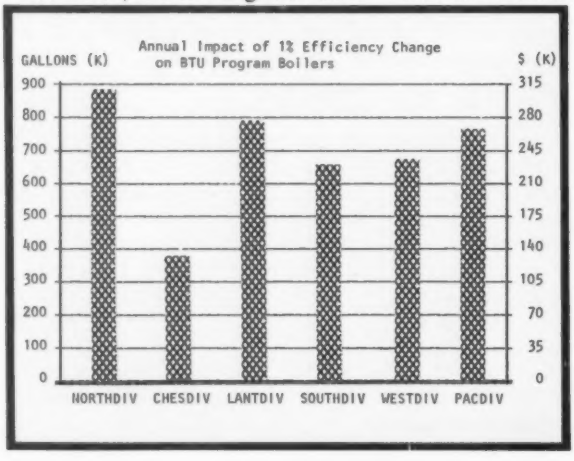
Everyone who is associated with public works knows that efficient boiler operation, with minimum emission of pollutants, is a real challenge to obtain. Old equipment simply was not built to meet the constraints imposed by today's pollution abatement laws or fuel shortages. Sticky valves, fluctuating oil pressure, binding in linkages, changes in fuel characteristics and other seemingly small problems cause significant changes in efficiency and, if that were not enough, increase pollutants emitted.

Yet, after minor repairs and adjustments are made to existing equipment, accurate settings can be established and an immediate fuel savings can be demonstrated. These fuel savings are real and, with a modicum of effort by plant operators, can be sustained. However, even more important are potential savings that are identified and that can be realized only if more sophisticated repairs are accomplished.

BTU Program results include both actual and potential fuel and dollar savings for boilers located in each of the six NAVFAC Engineering Field Divisions. What makes these data particularly compelling is the fact that economic analyses of individual repair requirements show paybacks that fall within guidelines established for energy conservation projects.

Of significant import is the fact that identified projects can improve efficiency of Navy boilers rated at 5 million BTUs per hour or greater by an average of 3 percent. While this may not seem very great, an increase of only 1 percent efficiency on BTU Program boilers will save the Navy more than 4 million gallons of fuel every year!

Fuel costs have risen meteorically during the past few years and are expected to go higher. For this reason it is of paramount importance that identified "quick-fixes" be made at the earliest date possible. However, it must be stressed that even new and efficient equipment will waste fuel and will become a pollution problem if not maintained and tuned to



BTU Program Estimated Annual Fuel Savings as of November 1976

	GALLONS (K)	$ (K)	GALLONS (K)	$ (K)
NORTHDIV	634.9	222.2	3,305.0	1,156.8
CHESDIV	622.5	217.9	1,123.6	393.3
LANTDIV	382.3	133.8	1,920.4	672.1
SOUTHDIV	219.4	76.8	1,849.5	647.3
WESTDIV	187.9	65.8	850.9	297.8
PACDIV	428.9	150.1	459.4	160.8
TOTAL 2,475.9		866.6	9,508.8	3,328.1

NOTE:
1. The fuel savings in this table are based on test reports filed at NESO using estimated attainable efficiencies of 80% for natural gas, 84% for light oils, and 85% for heavy oils.
2. Equivalent gallons of No. 2 fuel oil.
3. Dollars estimated at $0.35/gallon.

optimum efficiency by skilled personnel.

The traditional approach to boiler efficiency testing has been the use of the ASME short form. This method, entailing accurate metering of fuel, steam, and water flows along with laboratory analysis of fuel, is too expensive and complicated for day-to-day operations. A simpler, less costly, and slightly less accurate ASME short form (+ 1% of ASME short form results) involves flue gas analysis.

Flue gas analysis techniques involve measurements that reveal the completeness of combustion and the amount of useful heat rejected to the atmosphere through the stack. Fortunately, low-cost devices are available to aid plant operators in keeping boilers tuned. They are:

- **Stack Thermometer.** To pinpoint problems of excessive draft, defective combustion chamber, soot-coated heating surfaces, and improperly adjusted draft regulators.
- **O_2 Indicator.** Identifies excess air levels and unnecessary loss of energy through the stack.
- **C_2 Indicator.** Identifies problems of incomplete fuel combustion.
- **Smoke Tester.** The greater the emission the greater the fuel consumption and/or sooting on heating surfaces (a ⅛-inch soot buildup will decrease efficiency by as much as 9%).
- **Draft Gage.** Too much air wastes fuel, too little produces soot and also lowers efficiency.

Ideally, a self-contained combustion testing kit should be available at each boiler plant. Measurements should be taken once per work shift and whenever significant changes occur in operating parameters at the plant.

Properly tuned boilers can save from 3 percent to 8 percent of the total fuel consumption at typical Navy installations. This money and fuel saving goal is greatly enhanced by the fact that boilers that operate at optimum efficiency emit less pollution and can comply with air pollution rules and regulations.

The Navy Environmental Support Office is available to discuss equipment, instruments, and techniques to be used in reducing air pollution while getting more for your fuel dollar. A call to NESO's inquiry desk at Autovon 360-4182 or commercially at Area Code 805 982-4182 is a step in the right direction. □

Service contracts reviewed—
Extracts of graduate theses

By LT NEIL BROMILOW
CEC, USN
P.E., Va.
CECOS

Wider distribution of research by Civil Engineer Corps Officers is healthy for the development of the Corps professional abilities. The two papers selected deal with related topical areas. The first one concerns the process for increasing the "contracting out" of Public Works functions, while the second study discusses practical problems and solutions arising from service contracts.

The Moreell Library at the Naval School, Civil Engineer Corps Officers maintains a loan copy of these papers. If the thesis is identified with an "AD" number, a personal copy may be purchased ($3.00 hard bound copy; 95¢ microfiche) from the Defense Documentation Center, Cameron Station, Alexandria VA 22314.

PERFORMANCE IN SMALL MAINTENANCE SERVICE CONTRACTS

Key Words: Maintenance Service Contracting; Pre-award enforcement techniques.

Abstract: This study examines small (under $100,000) maintenance service contracts as they are written, awarded, and administered under Naval Facilities Engineering Command contract authority. Various significant pre-award decisions are discussed as they reflect on contractor performance. The commonly used post-award enforcement techniques are described and evaluated for effectiveness in assuring contractor performance. Contractor selection techniques are examined. Specific recommendations for improving contractor performance incentives through pre-award provisions, alternate methods of contractor selection, and strengthening post-award enforcement are discussed.

Reference: *Talutis, William R., LCDR, CEC, USN,* "Performance in Small Maintenance Service Contracts," Naval Postgraduate School June 1977.

Thesis: Master of Science In Management
AD # AO44326

APPLICATION OF THE COMMERCIAL OR INDUSTRIAL ACTIVITIES PROGRAM TO PUBLIC WORKS CENTERS

Key Words: Public Works Centers; Maintenance Service Contracting; Commercial or Industrial Activities Program; C/I Review.

Abstract: The publication explores the application of the commercial or industrial activities program to Navy Public Works Centers with particular emphasis on problems encountered at Public Works Center, San Francisco Bay. Initial discussion covers the evolution of the program at the national level and addresses some of the current controversy raised with the recently renewed emphasis on the program. Next, the development of detailed compliance and reporting procedures are traced through the Department of Defense to the level of the individual PWC. A sample submission prepared by PWC San Francisco Bay is presented to demonstrate some of the problems encountered. Following are the results of a study to demonstrate the potential effect on PWC San Francisco Bay overhead rates if various functions are contracted as the result of the C/I Program. Conclusions and recommendations are made regarding model specifications and contracting procedures for service contracting; definitive guidelines for computing depreciation; rising PWC overhead rates; and splitting of C/I functions.

Reference: *McClure, Thomas D., LCDR, CEC, USN, and Newton, Clifford C., LT, CEC, USN,* "Application of Commercial or Industrial Activities Program to Public Works Center". Naval Postgraduate School March 1977.

Thesis: Master of Science In Management
AD # AO40206 □

At San Diego:

Ship-to-shore wastewater transfer demonstrations

● San Diego, Calif.

A pipefitter from Pearl Harbor climbed aboard a Navy ship and took his station. A utilities systems operator from Puget Sound held her position as she helped direct a four-inch hose under pressure. And a fuel handler from Guam operated valves and fittings to ensure a successful trial run.

What were they doing and what did they have in common? What were more than 100 Navy military and civilian personnel from more than 40 West Coast activities doing on a San Diego waterfront? They all were participating in one of the Navy's many running battles against pollution.

In this particular skirmish, they gained valuable hands-on experience in the transfer of sewage wastewater from ship to shore. The trainees were in the midst of a four-day training workshop, another step taken by the Navy in its estimated $750 million program designed to comply with rigid federal environmental regulations. Under existing law, all ships must stop discharging untreated sewage wastewater into U.S. harbors by April 1, 1981. The Navy has completed more than 35% of this anti-pollution commitment.

To better comply with environmental legislation and to ensure a smooth transition to ship-to-shore wastewater disposal operations by deadline time, the Navy through the Naval Facilities Engineering Command (NAVFAC) has sponsored a series of training workshops. Organized and managed by the Navy Environmental Support Office (NESO), Port Hueneme, Calif., the workshops centered on the transfer of sewage from ship to shore facilities.

Attendees learned to handle, connect/disconnect, and clean sewage transfer hoses and equipment. They also were instructed in the prescribed health and safety procedures as required by the Navy's Bureau of Medicine.

Ships must be equipped with collection, holding and transfer (CHT) systems and must be certified to discharge into pierside sewers. Training for both ships crews and shore support assures a smooth addition of sewage transfer operations into the typical utility hookups of ships when in port (potable water, steam, electric power, etc.).

The Chief of Naval Operations (CNO) has authorized approximately 1,000 existing surface ships, submarines, service craft and boats to be equipped with shipboard sewage systems by deadline. All new-construction vessels will be delivered to the Navy with systems installed. As of mid-June, approximately 350 Navy vessels have been, or are being, furnished with the capability to discharge sewage wastewater into pierside sewer facilities. In addition, more than 280 of the 350 piers scheduled for ship support have completed constructing the required systems.

The final cost for ship sewage alterations (planning, specifications, installations, etc.) is estimated at more than $600 million. The ultimate cost of shoreside sewage facilities (piers, hoses, and other equipment) is placed at $130 million.

From opening remarks at the San Diego workshop it was evident that the program has high level visible support from both fleet and shore commands. RADM John D. Chase, Assistant Deputy Chief of Naval Operations for Logistics, and RADM Stanley T. Counts, Commander of Cruiser Destroyer Group FIVE, spoke of the importance of teamwork and cooperation between ships forces and shore facilities. They pledged cooperative support to ensure compliance with environmental legislation.

"CNO considers this program one of our top priority pollution abatement efforts and will do everything necessary to ensure its success," RADM Chase said.

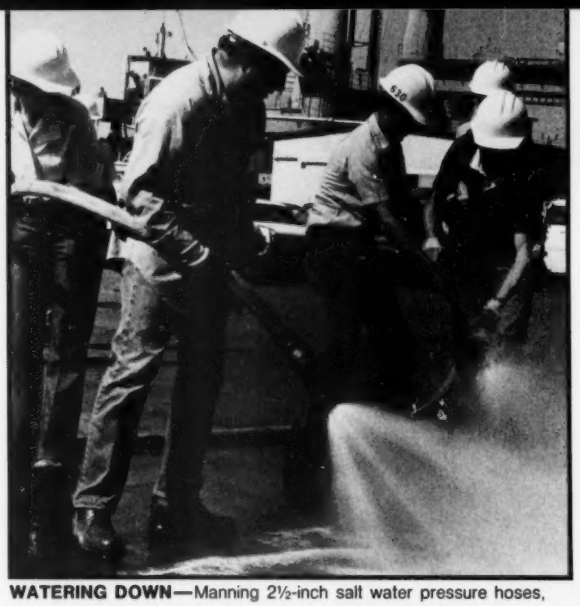
RADM Counts addressed some problems the fleet is encountering which require more maintenance support than had been anticipated. However, he stated "the troops will get in there and with a 'can do' attitude they will make it work."

RADM Chase said, "We have come a long way but we still have a way to go. I call on the forces afloat to complete deficiency corrections of their ship sewage systems that are within ships force capability to perform. I call on shore facilities for a greater effort to provide pierside services to ships."

Three of the four days were classroom-type sessions where experts in various phases of the program addressed pertinent points aimed at training and motivating pier crews. For example, the first day they learned their shoreside responsibilities involving furnishing of sewage transfer hoses, connecting and disconnecting ships to pier sewers, inspecting for leaks and breaks, and cleaning and maintaining hoses and fittings. They also were schooled on the comparatively new Ships Waste Offshore Barge (SWOB) and its role in the program.

Highlight of the workshop was the full day of hands-on training at a Navy pier, including hook-up to the *USS Monticello* (LSD-35) while ships crew operated the CHT system. In an actual salt water exercise, trainees heaved, tugged, connected, and disconnected several 50-foot, 150-pound sections of transfer hose between shore and ship. Personnel from the Public Works Center, San Diego, provided expert guidance and instruction.

Separated into four small working groups, the "students" spent considerable time at four work stations: cleaning, equipment, SWOB, and ship. Procedures and policies covering the entire pierside operation were explained and practiced. Ample time was taken to instruct



WATERING DOWN—Manning 2½-inch salt water pressure hoses, trainees practice cleaning the dock of simulated sewage spill.

GOING ABOARD—Trainees first observe and then help transfer hose from portable air-driven storage reel to the ship.

the trainees how and when to clean and maintain hoses, including salt water flushing. The importance of disinfecting hoses (when salt water is not adequate) was emphasized and the proper treatment with chlorine tablets was demonstrated.

Attendees were advised on the proper clothing to be worn during pierside operations as well as health and safety precautions to be followed. The Bureau of Medicine's list of recommended immunizations also were specified.

At the equipment station, trainees examined all hardware needed to operate the shoreside system for sewage discharge, such as hose storage racks, adapters, couplers and power hose reels.

The SWOB Station afforded most attendees their first look at the comparatively new sewage barge. With a total holding capacity of more than 77,000 gallons in its four tanks, the 106-foot long, low-lying barge serves three purposes: receive ships sewage where conventional pier lines are not available; transmit sewage from ship to pier; and offload sewage to shoreside systems for collection and treatment. A NAVFAC engineer and an instructor from Port Services explained operating procedures. Presently, 13 SWOBs are being delivered to Navy field activities.

The fourth learning-by-doing station involved the actual connection of sewage hose to a Navy ship. Several trainees found out why they were all told to dress in work clothes for the day. In teams of three or four, they took turns handling four-inch diameter pressure hose during wash down drills. Some got dirty, others got wet but everyone learned.

It was demonstrated that sewage transfer hose can be cleaned on the dock and that the lack of a permanent hose cleaning facility should not be a deterrent to ship-to-shore sewage transfer. Basically, a pier crew needs only the dock, hoses, pressure, and the knowledge. A shore sewage discharge operation can be handled by only two persons while military personnel aboard ship may number from three to six. As to the availability of hoses, NAVFAC said they are being procured on a priority basis.

Another high level CNO representative, Carl B. Irwin, head, ship and air system, environmental protection division, warned the workshop that if a certified ship fails to discharge sewage in port, a request from CNO will be initiated on an admiral-to-admiral level to determine the reason for non-compliance. Under the law, all certified ships must discharge through the system today and not wait until the 1981 deadline, Irwin explained.

The San Diego workshop, the last in a series sponsored by NAVFAC, was again moderated by CDR J.A. Walter, director of the environmental quality division. The final session featured a panel of six experts who responded to a variety of candid questions. It was again stressed that the NAVFAC engineering field divisions (EFDs) are the prime sources of problem solving. Attendees were advised that they now have the responsibility to share their newly-gained training and knowledge with others in their activities. They should make the time to conduct their own hands-on training program and ask the medical officer, or his representative, to visit and inspect their systems. Workshop participants were urged to continually review the NAVFAC Hose Manual (MO-340), a publication considered vital in the "how to" development of a successful ship-to-shore operation.

Each activity was provided sufficient information to prepare a standard operating Procedure (SOP) plan tailored to its unique circumstances and operations. Workshop leaders handed out a general SOP which served as an overall guide and was discussed at length.

Those present agreed that the workshop provided the proper answers they needed. David Reinhardt, director of port operations, Naval Station, Guam, said, "The hands-on training (at the pier) was worth the entire four days. I learned the correct SWOB procedures to make it operational." Edward Bruette, harbormaster, Naval Station, Pearl Harbor, said, "The workshop training now enables me to better understand and solve problems ships may have in the transfer of sewage to the pier."

Calling the workshop vital to the succes of the total ship-to-shore sewage transfer program, RADM Chase said, "It will help the Navy meet its needs and help to provide a clean environment." □

Naval Facilities Engineering Command

SITUATION REPORT

COUNCIL ON ENVIRONMENTAL EQUALITY (CEQ) GUIDELINES BECOMES LAW - Title II of the National Environmental Policy Act (NEPA) of 1969 established a Council on Environmental Quality (CEQ) to assess the nation's natural and man-made resources including air, acquatic and terrestrial environments. The CEQ published guidelines for compliance with NEPA in 1973. Modifications to these guidelines have now appeared in the Wednesday, November 29, 1978 (Part VI) Federal Register as final regulations and will become effective July 30, 1979. These regulations are designed to reduce paperwork and delays, and to produce better decisions. The uniform terminology, reduction of duplication of effort, placement of time limits on completion of EIS's, and page limits of normally 150 pages (300 in unusual cases) called for in the regulations will result in more effective environmental planning. Generally, the regulations will require identification of the project, development of all alternatives, and determination of the necessity for an environmental impact assessment or statement. If, after an environmental impact assessment (EIA) is made, it is determined that an environmental impact statement is not required, a notice of no significant impact must be published in the Federal Register. Should an EIS be required, a notice of intent must be published in the Federal Register, and a scoping process (requiring early public review and cooperation to determine significant environmental aspects of the project) must be undertaken. Specific information concerning the Navy's involvement in this process will be forthcoming in the revised Navy Environmental Protection Manual (OPNAVINST 6240.3E).

(NAVFAC Code 20)

High Pressure Sodium Lighting Is Compared to Other Systems

High pressure sodium (HPS) lighting systems are an attractive alternative to lighting systems presently found in industrial high-bay areas such as Naval air rework facilities.

High efficiency HPS lighting offers substantially lower energy consumption and life-cycle costs. Conversion of existing high-bay areas to HPS would be a major step toward meeting government energy conservation goals.

Since HPS lighting has a relatively low color rendering index, the Civil Engineering Laboratory (CEL) conducted an investigation to determine if color coded work (identification of colored wiring, etc.) could be accomplished satisfactorily. Ten basic colors (black, gray, brown, purple, blue, green, red, yellow, orange, and white) underwent controlled testing. The Laboratory determined that HPS lighting has adequate color rendition and differentiation.

It was learned that exclusive use of HPS may not afford adequate color rendition if identification of more subtle colors is needed. In such situations, HPS can be combined with mercury vapor or metal halide to obtain comparable color rendition and better energy conservation than from independent use of these sources.

To reduce initial installation costs, some designers have specified large wattage HPS lamps and luminaires with a large spacing-to-mounting height (S/MH) ratio. These specifications have caused excessive shadowing and glare, resulting in employee discomfort and decrease in productivity.

The trade-offs among S/MH ratios, lamp wattage, luminaire brightness, and the number of luminaires needed should be analyzed carefully.

In a published Techdata Sheet, "High Pressure Sodium Lighting Systems," No. 78-02, CEL also compared six lighting systems in a case study to determine which system was the most cost and energy effective.

For additional information, contact Fred Herrmann, Code L03C. Civil Engineering Laboratory, Naval Construction Battalion Center, Port Hueneme, CA 93043; Autovon 360-5562.

FRP Pipe Saves Energy

One manufacturer of fiber glass reinforced plastic pipe (FRP) has passed all Military Specification Tests and has been certified for use in condensate return lines.

The first major installation (over 5,000 ft) of FRP pipe is at the Long Beach Naval Shipyard. The use of this pipe will result in considerable energy and cost savings.

For additional information, contact Code 04, NAVFAC HQ, Autovon 221-0032.

Roofing Standards

Costly roofing problems have been reported recently. The problems resulted from misinterpretation of NAVFAC roofing standards, improper use of available roofing materials and the lack of periodic roofing maintenance.

Roofing is a specialized building element which requires knowledge and attention during the design and construction processes. Questions on NAVFAC roofing standards should be directed to *C. B. Key, Jr., Code 0461, NAVFAC HQ Autovon 221-0058.*

Alarm System May Protect Explosive-Laden Boxcars

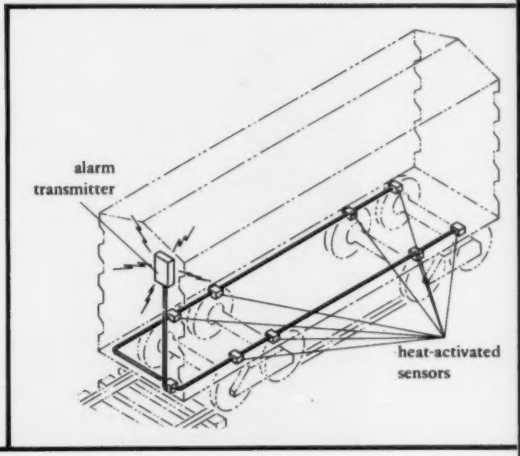
A heat-activated early warning system for railroad boxcars which carry explosives has been developed using commercially available parts.

The source most capable of supplying heat to produce total fire involvement inside a boxcar is normally a stuck brakeshoe. Approximately three hours is required to produce a fire. An early warning system will allow the train operators time for corrective action.

A heat sensor is attached to the boxcar directly above each wheel. The electrical harness for the system connects each sensor to a battery-powered tone-coded FM radio transmitter mounted near the top of the boxcar. Only one receiving unit is required for the entire train and is located in the caboose. It is capable of signaling an alarm and identifying the affected boxcar.

By adding other switching or triggering sensors, railroad operators could be alerted to attempts at theft, sabotage, or vandalism; smoke; excess vibration; or derailment.

Additional information can be obtained by contacting J. Brooks, Code L62, Civil Engineering Laboratory, Naval Construction Battalion Center, Port Hueneme, CA 93043, Autovon 360-4660.



A Professional Jogger

— Or Does Jogging Lead To Professionalism?

● Port Hueneme, Calif.

As the rising sun adds color to a neutral sky in Ventura, California, a lone jogger leaves his residence and begins a regularly scheduled three mile run.

Dressed in a blue and gold jogging suit (with tank top reading NAVY SEABEES) there shouldn't be a problem of identification.

The runner is Engineering Aide Chief Tim Buckley, USN.

"Jogging helps me to organize my thoughts," the chief explains.

Whether jogging or his admirable self-discipline is responsible for a well-organized thought process is really not material to Chief Buckley's story of success in becoming a registered professional engineer in the state of California.

Professional registration is the aim of all engineers. And, although armed with either a bachelor or graduate degree in one of the engineering disciplines and several years as an engineer-in-training, many do not reach their goal because of the arduous examinations. The State of California test is particularly one of the most difficult in the nation as it requires additional seismic or earthquake knowledge.

"I submitted my application to the California Board of Engineers in 1977 and started a 14 month self-study program," Buckley recalls. However, his friends point out, Chief Buckley's professional refinement actually began 22 years prior to filing for professional registration.

Discharged from his first Navy enlistment in 1955, Buckley returned to his hometown of Newport, R.I., where he was employed by the city public works department. He enlisted in the Navy Seabee Reserves and completed an associate degree in agronomy at the Stockbridge School of Agriculture. He also qualified as a professional land surveyor in Rhode Island which became the first stimulus of his private quest for professional engineer registration.

Recalled with his Reserve Seabee Battalion in 1966, Chief Buckley reentered the Navy, rated as an engineering aide. Following duty in Vietnam, Guam and Diego Garcia, and return to his homeport of the 31st Naval Construction Regiment at the Construction Battalion Center, Port Hueneme, Calif., Buckley was able to devote more time to his family, jogging, and the thought process he claims it induces.

The die cast with the filing of his application for registration, Chief Buckley entered a self-made and stringent training schedule prior to the examination.

"When he told me he wanted to take the examination," his wife Valerie said, "I promised him my support but in my heart was afraid he wouldn't make it without a college engineering degree."

So, for 14 months, after completing his daily Navy duties, the Seabee chief would return home and after a short mealtime visit with his family, retire to his engineering studies.

"This period was really rough on Valerie and the boys," the registered engineer admits. "They stayed

HOLDING THE PRIZE — Chief Buckley (center) displays certificate of professional civil engineer registration from State of California to CECOS faculty members with similar certificates. (From left) LTJG Brad J. Fowler; LCDR Charles S. Prahl; LT William H. Lewis III and LCDR James P. Kovalcik.

By DAVE FRAKER

THE SMILE TELLS IT ALL — Engineering Aide Chief Tim Buckley reflects his pleasure in accomplishing professional registration as a civil engineer in the State of California. Buckley is believed to be the only Navy enlisted man to have passed the stringent exam without formal education.

(more or less) in the kitchen area, while I occupied the living room with books, charts, notes and other documents."

But the Buckleys were committed, all of them.

"My greatest assistance came from the Naval Civil Engineering Laboratory at Port Hueneme," Buckley reflected. "The lab had established a refresher course for graduate engineers to prepare them for the approaching examination. I wasn't a graduate but I was permitted to attend," the chief grinned.

Buckley attended 12 sessions of the refresher course, recorded the lectures which he replayed during his private evening sessions and while working other problems. He also had access to technical volumes at the Moreell Library of the Naval School, Civil Engineer Corps Officers.

The Seabee engineer did not make his purposes generally known as he is of a reserved nature. Probably had he been more public in his endeavors he would have received ample *negative* advice.

The Buckleys persisted in their home study activities augmented with correspondence courses. The tough pattern of learning Buckley had designed for himself paid off on examination day. However, others with engineering degrees failed.

Buckley is now believed to be the only Navy enlisted man to have accomplished professional engineer registration without formal preparation. But personal professional accomplishment is really not new to the Seabee. Commenting about him, LCDR Allen Somers of the Public Works Center, New London, Conn., said: "When Chief Buckley came to the Naval Construction Training Center he had not attended the engineering aide school to which he was assigned. However, he quickly became a senior instructor. He established a number of Seabee training courses and advocated adoption of the Wang computer as an aid to construction scheduling. His interest in the computers predated the official adoption by seven years."

Another commissioned admirer is LTJG Chuck L. Doherty, CEC, USN, now of Keesler Air Force Base, Miss. He says of Buckley what many other Navy officers have said of their chiefs: "I was fresh out of school when Buckley became my first chief. He really taught me the ropes with sincere encouragement. We worked on many projects on Guam, and when the workload permitted, we undertook stimulating design problems of our own."

Now that his professional mission is completed, Chief Buckley spends more 'family time' and has renewed his activities with the Boy Scouts. During his 14 month study period he continued as cubmaster for Pack 3110 in Ventura.

The lone jogger has completed his early morning trek. He turns down the now-sunlit street leading to his residence. The run has been stimulating and his thoughts well organized.

Just what is he thinking up now?

Rear Admiral Iselin is noted throughout the Civil Engineer Corps for his gifted explanation of command philosophies. Members of his headquarters staff, and others, are afforded frequent opportunities to hear of the management techniques that prove the philosophies workable. Here, in a conversational tone, Admiral Iselin reports to readers of The Navy Civil Engineer specific mechanics of a Base Operating Contract as it applies to the Navy's new Trident Submarine support facility at Keyport, Wash.

Base Operating Contracts

● Alexandria, Va.

We have recently developed and awarded an interesting contract for the TRIDENT Support Base in Bangor, Washington. It was estimated that 500 to 700 public works employees would be required to operate the new base which is currently being built by the Officer in Charge of Construction, TRIDENT. It is no secret that civilian personnel ceiling points are extremely scarce in the Department of the Navy, even for high priority programs. In view of this, the Program Manager for Trident Systems Projects (PM-2) requested that NAVFAC contract for public works support as well as supply and computer support, fire fighting capabilities and base security, i.e., a base operating services contract. Obviously this was a new concept, so NAVFAC had to develop such a contract, and we did.

It is an incentive contract, and I will discuss that shortly, but let's first see what the scope of work is. The contract is comprised of three major work elements. The first element we call *Watch Standing*. We tell the contractor that for each specific work station, which we list, we require a certain caliber of person and that we want the station manned so many hours per week ... it might be 168 hours a week if the station is in a power plant, guard house or fire station; it might be 70 hours a week if it's in the special services area; it might be 60 hours a week if it's in the dining hall.

Whatever the group of "watchstanding" positions, once we nail down the specifics, the contractor can organize however he desires, run whatever hours per individual he wants (obviously within applicable laws), use overtime as he sees fit, move people around if he wishes ... in other words, he has total management flexibility to perform.

The Navy is not buying specific numbers of people; we are *buying a specified service*. We are also buying full management of that service by the contractor—as he reads our specs, or as we convince him he ought to be reading our specs.

The second element is *Performance*. We write down a performance specification; for example, we tell the contractor that he must maintain a specific list of automotive equipment to a specific standard, such as P-300 (we use many of our NAVFAC standards). Now here, we want to know a little bit about how he plans to meet the specification. He must tell us in advance what kind of people he will use and how he will organize and manage them to accomplish the task.

Once again we are not buying people; this time we are buying an agreement that he will maintain the equipment *to our specified standards*. (Later, we will inspect the contractor based on these standards.) But in this performance area we at least know in advance how he will set up to meet the specs, and approximately how he will be staffed. Again, we want his management of the planning and execution of the work in each performance area.

If the contractor finds that he needs more people to do the job, so be it—no change order is involved; he just estimated low. If he can do the job with fewer people and meet the performance spec, he is a little bit ahead ... we will see shortly that the management incentive to meet the performance spec at lowest cost is strong.

The third element is more difficult to define. When we can't write a good performance specification, or we're not sure of the quantity required, and we decide that providing unit prices for the function won't work, then we require the contractor to supply a fixed number of people to perform the functions ... a *Specified Level of Effort*. Here we are buying people, not results.

The contractor also provides us (in his original proposal) a price for increasing or decreasing personnel from the specified level in each skill area. If changes are required during the year, we execute an automatic change order increasing or decreasing the target price by the number of man-years times the rate specified in the contract.

By RADM D. G. ISELIN, CEC, USN
P. E., D. C.
Chief of Civil Engineers
Commander, Naval Facilities
Engineering Command

That is the general scope of the contract. To complicate it a little further, it is a fixed target, cost incentive contract.

We take proposals, review contractor staffing plans, and select a contractor based on a sound management plan at the lowest negotiated target price. Then, the minute we award the contract, it shifts to a cost basis. We compare actual costs to the fixed target. If all work is completed satisfactorily, and it costs precisely what was set as the target cost (say $13.7 million), then the contractor will be paid $13.7 million, plus his agreed to fee (say $800,000).

If, on the other hand, it costs more than the agreed target, the Navy will pay 85 percent of every dollar over and the contractor will pay the other 15 percent. This means that we will reduce the contractor's fee by 15¢ for each dollar that he is over the target cost until we reach 120 percent of the target. At that point, the contractor pays everything over 120 percent and the government stops paying.

On the other hand, if the contractor performs all services for less than the $13.7 million, then he will receive 20¢ of every dollar saved while the Navy takes the other 80¢. This feature obviously promotes good, hard, cost effective management of our Navy dollars.

Currently, as the contract nears the completion of its first year, the contractor is running slightly under the estimated cost and there is a cost saving being realized. The contractor's management is not perfect, but it is quite good. So far, several controversial points have developed and a few discrepancies have surfaced, but we're working on them and they are under control. One of our goals is to eventually change the *Level of Effort* piece of the contract into the *Performance* element and that effort is starting to move now.

This contracting concept bears watching as it develops and as we gain experience in its administration, since there may be more of these contracts under our jurisdiction in the future. □

An additional thought ...

Maintenance is a necessary and generally misunderstood function of facility engineering. Too often the most capable engineers avoid assignments to maintenance. Money, too, seems to follow a similar pattern. The best of it appears to go to construction; whatever remains goes to maintenance.

Maintenance should begin with facility planning, which should anticipate the maintenance phase and give consideration to those things that will ease the maintenance burden. Construction, more importantly design, should be performed with maintenance in mind. Maintenance personnel should have the opportunity for review of progress, frequent briefings and orientation.

Maintenance is one of the most complex operations that a facility engineer must perform. A solid case can be made for the assignment of the best personnel to maintenance. They must be men who can make a facility function while overcoming the shortcomings and errors of the designers and builders, as well as the effects of timex. They must appease admirals, bachelors and Navy families. They frequently must make do with inadequate equipment and a shortage of personnel. They must stretch budgets that are already too strained.

Adapted from "Highway Maintenance." By J. E. Linden, President and Chairman, DeLeuw, Cather International, Inc., WORLD HIGHWAYS, November-December, 1976.

Letters

Dear Editor:

It was comforting to have your company in the front seat of that dump truck (Letters to the Editor-Spring 1978) but I think your safety conscious correspondent (S. F. Lowe) should know that the inspiration for that illustration came directly from a photograph taken at a Seabee construction site. As for the crane sketch, the art was positioned askew. It was intended that the CEC officer be listing...not the crane.

Sincerely,
WILLIAM BRACK
Graphic Artist
NAVFACENGCOM HQ

22 June 1978

Sir:

I recently read the article by LCDR Charles S. Prahl on "Staff Civil Engineers" and wanted to take this opportunity to compliment the author for this fine article. Although I have no direct experience with staff civil engineers' problems, I felt the article was thought-provoking and generally well written. Too often we tend to gloss over problems in the CEC and only extol our many virtues. This article pointed out problems and offered suggestions for correction which right or wrong, provided a thought-provoking forum for additional thought and discussion.

Future such articles would be an invaluable addition to the "Navy Civil Engineer" and the NAVFAC family.

Sincerely,
J. B. Gant
LCDR, CEC, USN

26 April 1978

The Civil Engineer Corps welcomes graduates of CECOS's Basic Classes

CECOS Basic Course No. 148: Front row from left—Ens Douglas McVicar (RPI), Ens Richard Cellon (USNA), Ens Samuel Alexander (Tenn.), Ltjg James Wurst (Notre Dame), Lt Charles Salmond (USNA), Ens Richard Katz (Fla.), Ens Craig Savant (USNA), Ens Jeremi Kowalik, Jr. (Ore. State), Ens Robert Fretz, Jr. (VMI), and Ens Michael Gildon (Prairie View); **Second row**—Ens Ted Hough, Jr. (Nebr.), Ens Timothy Bond (New Haven), Ens John Siffert (Southern U and A&M), Ens Michael Patterson (Notre Dame), Ens Robert Kirby (VMI), Ens Mark Battle (Mich.), Ens Kevin O'Maley (The Citadel), and Ens Ronald D. Klem (Mont. State); **Back row**—Ens Mark Lydon (So. E. Mass.), Ens James Kelly (Notre Dame), Ens Gregory Long (USNA), Ens Daniel Lehr (Idaho), Ens John Stranix (Villanova), Ens Willard Thigpen, Jr. (The Citadel), Ens Thomas Calhoun (Vanderbilt), Ens Robert Bengston (N.D. State), and Ens George Eichert (Rochester).

CECOS Basic Course No. 149: Front row from left—Ens Robert King (Penn.), Ens Alfred Plourde, Jr. (Auburn), Ens Robert Sachuk (Worcester Poly.), Ltjg Thomas Brubaker (USNA), Lt Harold Lowe (Kans.), Lt Kenneth Dampier (Geo. Washington), Ens Robert Pete (Del.), Ens Fred Lapiana III (Norwich), Ens Carla Angelo (Va. Poly. and SU), Ens Terry Kinnaman (Kans.), and Ens John Snyder (Miss. State); **Second row**—Ens Donald Orndoff (Va. Poly.), Ltjg Stephen Duba (USNA), Ens Gary Engle (Cleveland State), Ens Rex Wright (Auburn), Ens Robert Bossa (Fairleigh Dickinson), Ens John Bollinger (Del.), Ens Michael Schaefer (Missouri-Rolla), Ens Bruce Carson (Purdue), and Ens Robert Didion (Minn.); **Back row**—Ens Kenneth Rado (Del.), Ens George Powers (Va.), Ens Allen Gifford (Union Coll.), Ens David Basile (Tex. A&M), Ens Alan Barszewski (Western New England), and Ens Lawrence Weathers III (Del.). Not shown, Ens Ronald Hertwig, Jr. (USNA).

Good people will make it work...

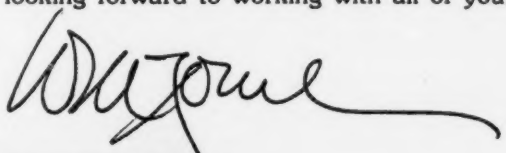
I have worked in military construction facilities management with a small tri-service staff in the Office of the Secretary of Defense (OSD) during the past fifteen months. Although we made several short field trips, our world was primarily one of "desks and paper." We worked constantly with Congressional staffs, different parts of OSD, and other Federal agencies in an attempt to ensure that legislation, policy direction, and other administrative controls were reasonable, not overly restrictive, and would allow field personnel to do their jobs. It was a challenge.

One of the complaints that I hear most frequently today is that we are surrounded by . . . perhaps immersed in . . . a myriad of controls and restrictions. As a result, it is harder to get people to do business with the Federal Government. It follows that our basic job of building and managing the Navy's facilities is made more difficult.

I think most of these complaints are valid and there does not seem to be a single simple corrective solution available. We live in a complex society. Many forces drive us in many directions at the same time: reduce inflation, improve wages, reduce taxes, ensure safety, look out for small business, reduce unemployment, ensure equal rights, improve the environment, save energy . . . you know them well. Who can argue against sincere efforts to make these good things happen? Unfortunately, these forces affect our business . . . and our job is to put it all togethe and still get on with the basic work.

I have had the opportunity to visit field activities of all the services over the past fifteen months, and I have talked with many of you . . . the men and women out "where the action is." I have been very impressed with the work you are doing . . . and one personal trait stands out that is common to all: dedication. Good people, working hard, overcoming barriers and frustrations, get the job done. With a spirit like that, nothing is too difficult. Simplify it . . . straighten it out . . . improve it. Good people will *make* it work.

As I move into the Headquarters, I will strive to do a little each day to make it easier for you to get the job done. Keep at it. I am enthusiastically looking forward to working with all of you.



WILLIAM M. ZOBEL,
Rear Admiral, CEC, USN
Vice Commander, Naval Facilities
Engineering Command and
Deputy Chief of Civil Engineers

An invitation to young graduate engineers to join the young professionals of the U.S. Navy

CIVIL ENGINEER CORPS

Construction and maintenance of the Navy's shore and support installations is just one of the responsibilities of the engineer managers of the Navy's Civil Engineer Corps. And qualification is not limited to the civil engineering discipline, as the Corps requires graduate engineers of mechanical, chemical, electrical, industrial and construction disciplines and architecture too! As a commissioned officer of the U.S. Navy the young engineer is offered greater opportunity to develop quickly a professional career with the added potentialities of an exciting overseas assignment, professional registration and graduate studies! The young officer may be assigned to construction contract administration, public works management or with a Naval Mobile Construction Battalion, the historic Seabees, plus many individual and unique positions.

Engineering students and counselors are invited to explore the multi-faceted world of the Navy's Civil Engineer Corps by contacting their local Navy recruiter for specific details. An informal visit with a Civil Engineer Corps officer to discuss the personal and professional benefits of a Navy career can be arranged by the same Navy recruiter or by calling or writing the Naval Facilities Engineering Command, (ATTN Code 09MA1), 200 Stovall Street, Alexandria, Va., 22332 Telephone: (202) 694-3635.

Call toll-free 800-841-8000 now if you desire instant information from the Naval Recruiting Command. If you're a good student, and want to be a better engineer, the chances are you'll do best by investigating the Civil Engineer Corps of the U.S. Navy.

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